

# **EXHIBIT 20**



# Release Notes

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## Trigence AE

Version 3.2.0

December 2008

Trigence Corporation is releasing version 3.2.0 of the Trigence AE product. These release notes provide information about the enhancements and resolved problems in this release. The information in this document supplements and supersedes information in the Trigence AE product manuals.

### The following topics are described:

1. What's new in version 3.2.0? .....	3
2. What's new in version 3.0.9? .....	4
3. What's new in version 3.0.8? .....	12
4. What's new in version 3.0.7? .....	16
4.1. Optimized performance and bug fixes .....	16
5. What's new in version 3.0.2? .....	17
5.1. Re-engineered Capsule Creator .....	17
5.2. Capsule Controller enhancements.....	17
5.3. Extended platform support.....	17
5.4. Capsule File Mapping .....	17
5.5. SOAP interfaces.....	17
6. Common issues and their resolutions .....	18
6.1. Environment .....	18
Cannot create a secure shell session into the Capsule Controller Platform .	18
6.2. Capsule Creator .....	19
Capsule Creator cannot open DISPLAY on host .....	19
Learn Mode fails if xterm is not installed on the Creator Platform .....	19
6.3. Capsules .....	20
6.4. Capsule Controller Interface Commands (trictrl) .....	27
Only change capsule IP address from Capsule Controller interface .....	27
Do not change UoS subnet from within Capsule.....	27
Do not change UoS NIC from within Capsule .....	28
Do not change UoS routing from within Capsule .....	28
Virtualized Capsule fails when virtual memory limit is set too small .....	28
"Needs Manual Upgrade" state is displayed during capsule copy.....	29

7. Open issues and their resolutions.....	30
7.1. Capsule Creator .....	30
Previous capsule folder is preserved (not removed).....	30
Services do not start in a remotely encapsulated SUSE Linux Enterprise	
Server 9.0 capsule.....	30
7.2. Capsules .....	31
sigrelse01.....	31
Changing CPU binding from a single CPU to a set will fail on Solaris.....	31
The who -r and fuser commands do not work inside a capsule .....	32
The cp command fails on ZFS or NFSv4 file systems with "failed to get acl entries" .....	33
Cannot rename a directory located in UOS from inside a virtual capsule .....	33
Using scp to copy a file into a virtual capsule returns "scp: <filename>: truncate: Invalid argument" even though copy succeeds .....	33
NIS configuration problem for some capsule applications .....	34
Capsule Controller Platform inherits capsule date and time changes .....	34
Digital Rights Management (de) capsule property is not supported in this release .....	34
Cannot connect to port 7002 error for encapsulated BEA.....	35
Encapsulated Red Hat 2.4 gnome applications on Linux 2.6 systems .....	35
tclonefs application fails on root_squash NFS directory.....	36
mount and df commands display incorrect information from inside a capsule	36
Directory permission requirements differ on Solaris vs. encapsulated Solaris	36
read and pread system calls differ on Unix vs. encapsulated Unix .....	36
User and group forced excluded files may be required for some 'basic' encapsulated applications .....	37
7.3. Capsule Controller Interface Commands (trictrl) .....	38
Capsule starts with "insserv: can not symlink" messages .....	38
8. Product Documents .....	39
9. Customer Support .....	39

# 1. What's new in version 3.2.0?

TrigenceAE 3.2.0 offers the following capabilities:

- Removal of templates and the need for “activation” of capsules.
- New separate commands to compress and uncompress capsules.
- Independent management of compressed (.con) and uncompressed (expanded file sets) capsules.
- Ability to dock a compressed capsule to a path, even if the path is not programmed in the Controller.
- Ability to ‘synch’ up a capsule file set.
- Ability to store the compressed and uncompressed capsule in different folders.

In TrigenceAE 3.2.0, the concept of capsules in the “template state” has been removed. There is no need to activate a capsule after it has been created.

This version 3.2 introduces a new model for managing capsules. The Controller now identifies and separately manages compressed (.con) and uncompressed (expanded file set) formats of the capsule, allowing you to modularize the work with each type of capsule media format. For example, you can now work with the expanded file set without worrying about the need for the compressed (.con) file and you can change the properties of the .con or expanded file set separately.

The compressed and uncompressed capsules are independent. The Controller is able to identify the location of each, which allows both versions of the capsule to be stored in different locations or in a remote storage device.

In this release, once a capsule is created it is ready to be used in its uncompressed format (expanded file set) and/or can be compressed for mobility.

The following new trictrl commands have been added in this release: compress, uncompress, synch and klog. Please refer to the user guide for the syntax and usage of these commands.

## 2. What's new in version 3.0.9?

The following issues have been resolved in the 3.0.9 release:

Tracking number	Issue	OS (Linux/Solaris/Both)
4475	"dock -m" option doesn't change capsules MAC address.	Both
4465	Executing commands with pipe leads to intermittent process rights elevation	Both
4413	Kernel panic executing gedit/firefox applications for virtualized capsules.	Linux
4452	Oracle listener not starting on the 3.0.9 stream, Linux	Linux
4397	Can't undock because mount points in /tmp of the capsule are still busy	Both
4024	getdents64 not obeying namespace filtering, 'ls' command showing filtered files	Both
4416	Resolving a file with symbolic links loops through namespaces took ~2300 system calls!	Both
4426	Incorrect saved effective user IDs in the capsule	Both
3862	Oracle 9i is crashing under the stress test due to setuid issues	Solaris
3837	SOAP server generates an error message in /var/adm/messages	Both
4002	You can start two DHCP capsules with the same MAC, which will then have the same IP address	Both
3924	"tar cvf test.tar /etc/mnttab" file changed size	Both
4401	On upgrade unable to create back up file at /usr/local/trigence/capsules/.	Both
4383	Upgrading a capsule with the -nw flag causes	Both

Tracking number	Issue	OS (Linux/Solaris/Both)
	the deletion of the .con file	
4377	Attempting to re-start a failed start or re-shutdown a failed shutdown capsule fails due to errors	Both
4382	capsule shutdown attempting to bring down an nonexistent network interface (i.e. dmfe0:none) generating warning messages	Both
4381	warnings on /tmp at capsule startup/shutdown	Both
4379	Expanding a tar file inside the capsule may generate a core dump	Both
4366	Java compilation error on a relatively long duration compilation due to memory corruption	Both
4335	IPMP: capsule network startup fails when the current NIC is unavailable but a failover NIC is available	Solaris
4334	IPMP: capsule network shutdown fails after i/f fails and is switched.	Solaris
3074	Able to create two cloned capsules with the same name	Both
4299	trictrl help leaking memory when called without any arguments	Both
4265	upgrading an activated capsule with only the expanded file set leads to an error and the run time is not upgraded	Both
4008	Automounter in the capsule hanging – Part2	Both
4225	Uname -a is showing UOS kernel patch level (creator)	Both
1286	need a feedback mechanism (progress bar + percentage) during dock/undock/activate	Both
4104	Uname -a is showing UOS kernel patch level	Both

What's new in version 3.0.9?

Tracking number	Issue	OS (Linux/Solaris/Both)
	(controller)	
3834	Mounting of NFS share fails from a RHEL4.4 machine on which TrigenceAE build is installed.	Linux
4061	Cannot touch a file on a Isilon NFS server	Both
2951	If Trigence install directory name has a space, ./trictrl start fails	Both
4010	nsswitch.conf manipulation in the capsule incorrect, leading to seg fault of the getent utility when capsule starts up	Both
3995	losing host entry "nicknames" when starting static capsules	Both
4017	"pfiles" makes JBoss process unresponsive	Solaris
4023	In a capsule, "showrev" returns the release version of the UOS, not the OS version where the capsule was created.	Solaris
3067	Enable option on a mount point through the creator doesn't end up in a mount in the capsule	Both
4033	Performance tool to measure time spent in the runtime	Both
4007	Java process crashing after heavy traffic in production	Both
3136	Uninstall script cleanup – soap	Both
3140	Create-in namespace filter	Both
4008	Automounter in the capsule hanging – Part1	Both
3963	umask set at installation time could cause severe issues at runtime of the capsule	Both
4006	The setup script is not executable on the CD image	Both

Tracking number	Issue	OS (Linux/Solaris/Both)
3459	Execution bit doesn't work for regular users.	Both
3968	Enterprise Access application doesn't work with localhost interface.	Both
3956	Tibco application can not start. .	Both
3960	localhost connections appear to come from capsule IP.	Both
3848	Upgrade process removes any customs script you may have in cstore/trigence/bin	Both
3965	Previously docked capsule would end up in the restarted state upon system reboot	Both
3953	`getsockname()" function doesn't populate sockaddr_in for incoming connections	Both
3947	"trictrl dock" blindly obeying to controller property "dd" even though an expanded file set is specified in "cp"	Both
3949	cloned capsule retains original IP address rather than taking the one specified in the clone command	Both
3941	Capsule /tmp directory has incorrect permissions set	Both
3477	Trictrl can't dock a capsule if an empty directory with the exact capsule name exist	Both
3933	Can't execute a binary for a non root-user, non owner of a file and being part of a supplementary group	Both
3927	Capsule directory merge process failing for SunONE (java system application server)	Both
3811	Trictrl prevents changing controller properties when processes in the capsules are running	Both
3887	Trictrl li lists two different entries for each capsule	Both

What's new in version 3.0.9?

Tracking number	Issue	OS (Linux/Solaris/Both)
3908	PWDX command from UOS returns cstore path	Solaris
3852	Unable to dock capsule after getting "capsule directory already exists" error.	Both
3746	Unable to upgrade a capsule to the load 3.0.9-cc07w51b-2	Both
3653	Misleading error when docking and the capsule is expanded on a location not being the default capsule location	Both
3758	Operation Successful message should not appear when there are errors "shutting down" a capsule.	Both
3563	Issues with system utility "df"	Solaris
3490	``loghost" entry is getting removed from /etc/hosts in the capsule upon every start.	Both
3485	Application fails when it binds the same port to localhost and the IP of the capsule	Both
3790	Contract file system (CTFS) can not be accessed from the capsule	Solaris
3513	Incorrect controller behavior for re-appeared files and capsule directories over SAN.	Both
3532	Wording at uninstallation of product suggests capsules needs to be undocked to proceed	Both
3734	Allow upgrades of hot fixes which use high CFS_VERSION	Both
3718	Thread stacks leaking in upcalls	Solaris
3720	mount() system call failing due to 7th and 8th argument not being processed	Solaris
3719	need to use the get_cwd() system call from the UOS (when available; Sol10) rather than the version from Trigence	Solaris

Tracking number	Issue	OS (Linux/Solaris/Both)
3243	Problem mounting Clearcase MVFS from within capsule	Solaris
3397	trictrl to check the directory path when executing e.g.: undock and automatically take the user away from the capsule directory.	Both
3700	Undocking a capsule with non-NFS mounts can end us up being in the Undocked Aborted state	Both
3612	Kernel module memory leak leading to a crash (Oracle/fuser)	Solaris
3489	trictrl & creator fails on LINUX platform	Linux
3463	procedure for creator-snapshot.sh confusing; ending up with capsules with mixed binaries	Solaris
3512	Can not run "trictrl run" as non-root user	Both
3492	Supporting multiple domains across multiple capsules and UOS	Both
3394	"trictrl learn" doesn't capture all dependencies when "su -" is invoked	Both
3480	The accept() system call fails when called with null arguments	Both
2630	After Installing Trigence AE controller, if we try to mount a directory from a remote machine, it gives "Rpcbind failure RPC : Timed out" error.	Both
3200	Shouldn't allow new capsules on old setup (i.e. 3.0.9 capsule on 3.0.2 install)	Both
2750	'couldn't set locale correctly' is displayed on attempt to start a virtualized capsule	Both
3064	Improper error message displayed when docking and cloning a capsule which has a CPU binding value set to non-existing	Both
3458	Symbolic link belonging to the UOS works in the	Both

What's new in version 3.0.9?

Tracking number	Issue	OS (Linux/Solaris/Both)
	capsule	
3380	Incorrect wording when reinstalling the software	Both
3462	The use of the cp command during an upgrade or clone operation fails to preserve symbolic links	Both
3441	Capsule discovery mechanism registers expanded capsules found in any of the search path directories as well as the expanded path.	Both
3317	Controller tends to remember capsules even when the location has changed	Both
3471	“tmp” dir inside the capsule should behave properly	Both
3424	Uname –a returns the UOS version in a basic capsule moved to the target	Both
3379	T1000 can not run the Creator	Both
3470	All the static libraries (.a files) are included with the installer	Solaris
2962	Creator: If CPU value is provided a capsule building process will stay at 99%	Both
3382	Capsule applications in zones crash if logging is enabled and trigMgmt was not started	Solaris
3372	Hardcoded maximum of 128 FDs per process	Both
3367	In the capsule “kill -TERM <pgid> no such process”	Both
3385	Enabling/disabling kernel module logging	Both
3434	Ability to upgrade a capsule without saving the .con file	Both
3409	Creator Java exception with remote capsule creation - broken symbolic link	Both

Tracking number	Issue	OS (Linux/Solaris/Both)
3401	Operation Successful message should not appear when there are errors starting a capsule.	Both
3404	Interface aliases not being reclaimed when the secondary network setup fails	Solaris
3431	Oracle8i can not start – invalid file descriptor	Solaris
3343	Undocked .con file gets a copy of the IN_USE_BY_CONTROLLER GUID	Both
3400	Error that kernel module and controller are out of sync	Solaris
3390	Trictrl commands taking huge amounts of time	Both
3386	Upgrade fails if the capsule was previously docked by a different controller	Both
3144	Failed to setup network routing table - virtualize capsule fails to start. Rif garp failing with some ethernet devices naming syntax	Solaris
3344	Timeout value for current locking mechanism is too short giving errors at trictrl commands	Both
3329	Unable to ssh, ftp or telnet to Zones from the Global Zone or from another system in the network	Solaris
3306	Solaris8 applications giving bus error on T1 Niagara chip (SunFire T1000/T2000)	Solaris

## 3. What's new in version 3.0.8?

Enhancements to Trigence AE version 3.0.8 include

- Undocking a Capsule without deleting its expanded file set, resulting in reduced time required for docking, undocking, and activating a Capsule
- The ability for multiple Controllers to view the same Capsule on a network share, for instance Network File System (NFS) or Internet SCSI (iSCSI), as well as on a Storage Area Network (SAN).
- Faster upgrades and re-installations of the Controller
- Properties of the capsule can be changed without requiring a lengthy dock operation
- Cloning a Capsule puts the new Capsule in the docked state
- Activating a capsule leaves the capsule in the undocked and expanded state

The following is a summary of what is new in Trigence AE version 3.0.8.

### 3.1. Capsules

The enhancements to Capsules include:

- Trigence AE version 3.0.8 includes the new undock option -s, which skips the deleting of the expanded file set. The advantage of using the undock option -s, is that there is no waiting for the expanded file set to be deleted before the undocking program finishes.

Another advantage is the time saved when re-docking the Capsule. The expanded file set already exists, so there is no lengthy wait for it to be created; the dock program only has to include any changes made to the Capsule's properties in the expanded file set.

- The list command output includes a new column called Expanded that displays either "Y" or "N". "Y" indicates that the Capsule's file set is expanded; "N" indicates that it is not expanded.
- The expanded file set is not deleted when you activate a Capsule; therefore, the Capsule does not have to be expanded during the subsequent dock command.
- You can clone a Capsule that is presently docked but shutdown without having to first undock the Capsule.

### **3.2. Capsule Controller**

In Trigence AE version 3.0.8, more than one Controller can view a Capsule at the same time. However, only one Controller can govern how the Capsule and its contents interact with the OS and other applications at a time.

The dock and undock programs include the new option `-f`, which allows a Controller to take control of a Capsule that is currently being governed by another Controller.

This is useful in a disaster recovery situation, where if Controller A fails, Controller B assumes control, or in a multi-user environment where various Controllers need to control the Capsule at different times.

Before taking control of a Capsule, use the list option `-l` to view the state of the Capsule to ensure that it is not in the middle of an operation for the governing Controller.

A second newly added column in the list command output displays the Controller global unique identifiers (GUID) that are used to identify the Controllers that are currently governing the Capsules in the list.

The hostfs GUID identifies the Controller that is running on the machine. The Controller GUIDs matching the hostfs GUID identify the Capsules that are being governed by the Controller on the machine. Controller GUIDs that do not match the hostfs GUID identify the Capsules being governed by a Controller on a separate machine.

When a Capsule is not in use by any Controller, the Controller GUID is empty.

A message also appears on the machine when a command is issued against a Capsule that is being controlled by a different Capsule Controller. The message and the log are identical and list the GUID of the Capsule Controller that currently has control of the Capsule.

### **3.3. Installation**

It is no longer necessary to undock the Capsules before reinstalling or upgrading the Capsule Controller. Simply reinstall or upgrade the Controller by shutting down the Capsules that are currently running.

### **3.4. Upgrading Capsules**

The enhancements to upgrading Capsules include:

- During the Capsule upgrade process to the Controller version, the Capsule file set is no longer removed upon completion of the operation.
- The upgrade command also includes the new option `-f` that allows a Controller to take control of a Capsule that is currently being governed by

What's new in version 3.0.8?

another Controller. See the section, "Capsule Controller," for information about checking the Capsule's state before upgrading.

### 3.5. Issues resolved

The following issues have been resolved in the 3.0.8 release:

Tracking number	Issue	OS (Linux/Solaris/Both)
3241	Namespace issue copying files to capsule	Both
3309	Dtrace causes kernel crash	Solaris
3303	Processes getting booted out of the capsule	Solaris
3244	/usr/bin/ps -ef reports up to 80 char and it swaps the last argument with something that is short enough to fit in, instead of truncating the very next argument for the procs spawned within the capsule.	Both
3220	"ps" (bsd version) run inside the capsule showing tloader and capsule data path	Both
3272	trictrl perfor <capsule> : is not reporting real time CPU usage	Solaris
3212	UDP packets sent to localhost in the capsule end up in process binding to localhost in UOS	Both
3172	Capsule showing same IP address for all interfaces through ifconfig	Both
3170	DCE application giving SIGSEGV or exhibiting incorrect behavior	Solaris
3166	App stack size severely reduced not letting Trigence code to run - "reserve app" core dumping with SIGSEGV	Solaris
3171	FDs being leaked not allowing to SSH to the box	Both
3081	Symbolic links in the capsule context are not properly resolved	Both

Tracking number	Issue	OS (Linux/Solaris/Both)
3153, 3161, 3162	Launch oracle from a user within the dba group, but not oracle user	Both
3150	Relocation error: symbol_libc_register_forkhandler: referenced symbol not found, with Solaris 2.6 capsule on Solaris 10	Solaris
3155	Find and chmod -R command hang when ran inside a Solaris 2.6 capsule	Solaris
3154	Shared memory error in a Solaris 2.6 capsule with Mapper application	Solaris

## 4. What's new in version 3.0.7?

The following outlines what's new since version 3.0.7 of the Trigence AE software.

### 4.1. Optimized performance and bug fixes

System performance is enhanced through optimization of the base product. In addition, several open issues were addressed.

## 5. What's new in version 3.0.2?

These topics describe the major new features of this product.

### 5.1. Re-engineered Capsule Creator

The utility that is used to build application capsules from existing applications has been updated to simplify the process. One key enhancement is the new Intelligent Discovery capability that identifies candidate files and libraries for proper encapsulation by watching the access patterns of the application when it is executed.

### 5.2. Capsule Controller enhancements

The Capsule Controller, the runtime component that is loaded on each managed server, has been re-engineered for standalone operation, eliminating the dependency on additional management servers and consoles.

### 5.3. Extended platform support

This version supports Solaris 9 and 10 operating systems, as well as capsule support for Solaris 2.6, 2.7 and 8. This version also supports both 2.4-series and 2.6-series Linux kernels, with testing on Red Hat and Novell SUSE server distributions. Additional platforms will follow.

### 5.4. Capsule File Mapping

This interface provides per-file control over how processes running within a capsule access both encapsulated and host-based files.

### 5.5. SOAP interfaces

These new control interfaces, based on industry standards, provide a simple approach to integrate the management of application capsules with existing management tools, including performance and health monitoring, IT automation and orchestration, software distribution and configuration management, and server virtualization.

## 6. Common issues and their resolutions

This section describes issues that are common. This section can help you during troubleshooting:

### 6.1. Environment

Version	Tracking Number	Issue
Any	2081	<p><b>Cannot create a secure shell session into the Capsule Controller Platform</b></p> <p>After installing Trigence AE onto a server, you cannot create a secure shell session (ssh) into that server. You will see an error message similar to the following:</p> <pre># ssh root@ControllerPlatformHostname ssh_exchange_identification: Connection closed by remote host</pre> <p>Workaround: The <i>ListenAddress</i> parameter in the <i>/etc/ssh/sshd_config</i> file is set to an existing IP address and this is causing a conflict. Edit the <i>/etc/ssh/sshd_config</i> file and update the <i>ListenAddress</i> line. Either disable the <i>ListenAddress</i> parameter by removing or commenting it or set it to a value of 0.0.0.0.</p>

## 6.2. Capsule Creator

Version	Tracking Number	Issue
Any	1938	<p><b>Capsule Creator cannot open DISPLAY on host</b></p> <p>The Capsule Creator will not start on a remote machine, even with the <code>DISPLAY</code> environment variable correctly configured. You may receive a message similar to the following:</p> <pre>Exception in thread "main" java.lang.UnsatisfiedLinkError: /trigdir/java/j2rel1.4.2_04/lib/i386/libawt.so: libXp.so.6: cannot open shared object file: No such file or directory</pre> <p>Workaround: The Capsule Creator requires the minimum X compatible libraries to be installed. Install the <code>xorg-x11-deprecated-libs-*.rpm</code> package on the server where the Capsule Creator is installed.</p>
Any	1999	<p><b>Learn Mode fails if xterm is not installed on the Creator Platform</b></p> <p>When you run learn mode from the Capsule Creator, nothing happens.</p> <p>Workaround: The xterm program must be installed in order to run learn mode. To confirm that this is the problem, enter the following command:</p> <pre># ./trictrl learn -x</pre> <p>If you receive the following message, xterm is not installed on the server:</p> <pre>Error: Cannot find xterm which is required for learn mode</pre> <p>Install xterm on the server where the Capsule Creator is installed. Refer to the xterm documentation for installation details.</p>

Common issues and their resolutions

## 6.3. Capsules

Version	Tracking Number	Issue
Any	2941	<p><b>The inetd service doesn't work properly in the capsule on Solaris</b></p> <p>The inetd service causes conflicts with functionality in the Trigence software.</p> <p>Workaround: For instance, to use telnetd and ftpd in a Solaris capsule, do the following:</p> <ol style="list-style-type: none"> <li>1) Do NOT include inetd as a service from the service selection screen in the Creator.</li> <li>2) Include telnetd, ftpd and all dependencies in the capsule.</li> <li>3) Either manually start inetd using "trictrl run &lt;capsule&gt; /usr/sbin/inetd -s" or put "/usr/sbin/inetd -s" as your startup script.</li> </ol> <p>On a Linux platform, you only need to include 'xinetc' from the services selection screen in the Creator.</p>
Any	3061	<p><b>In some cases, a capsule will fail to start if the startup program needs to write to stdout or stderr.</b></p> <p>When a startup programs attempts to write to stdout or stderr, it will fail because it couldn't get a TTY.</p> <p>Workaround: The startup script must redirect both stderr and stdout to either a file or /dev/null.</p>

Version	Tracking Number	Issue
Any		<p><b>Encapsulated basic capsule application fails</b></p> <p>Some basic capsule applications may fail because session, lock, cached or authentication files exist inside the capsule. These files may conflict with the normal operation of the capsule application.</p> <p>Workaround: Ensure that session, lock, cached or authentication files are excluded when the capsule is created or delete these files after the capsule is created.</p> <p>During capsule creation, after you run learn mode on an application and you have completed your file selection, you must review the contents in <b>/etc</b> and your <b>/home</b> directory to identify if you have included files from these paths in your capsule. Be careful what files exist in these directories. If you plan on using the underlying operating system for security and authentication, ensure that security and authentication files do not exist inside the capsule.</p> <p>If you did not exclude these files during capsule creation, complete the following procedure to delete these files from the capsule. Before deleting any files, you must ensure that you set the “Create in Namespace” capsule property (cr) to the capsuleGUID or you may accidentally delete host files.</p> <ol style="list-style-type: none"> <li>1. Log into the Capsule Controller where the capsule exists.</li> <li>2. Change the “Create in Namespace” capsule property (cr) to the capsule GUID. (The default is the hostfs GUID.)</li> </ol> <pre># ./trictrl edit cr=&lt;capsuleGUID&gt;</pre> <p>For example:</p> <pre># ./trictrl edit cr=591C314726581F20</pre> <ol style="list-style-type: none"> <li>3. Dock the capsule (or undock while saving the changes and re-dock if it was already docked).</li> <li>4. Ensure that the files that you would like to delete exist in the capsule:</li> </ol> <pre># ./trictrl dir capsulename -l   grep /etc/passwd</pre> <ol style="list-style-type: none"> <li>5. Run <b>/bin/bash</b> in the capsule. For example:</li> </ol> <pre># ./trictrl run capsulename /bin/bash</pre> <ol style="list-style-type: none"> <li>6. Delete the required files from the capsule. For example:</li> </ol> <pre># rm -rf /etc/passwd # rm -rf /home/.ICEauthority ...</pre> <ol style="list-style-type: none"> <li>7. Exit <b>/bin/bash</b>.</li> <li>8. Change the “Create in Namespace” capsule property (cr) back to the hostfs GUID. For example:</li> </ol> <pre># ./trictrl edit cr=0000000000000001</pre> <ol style="list-style-type: none"> <li>9. Undock the capsule with the -w option (to save the change).</li> </ol>

## Common issues and their resolutions

Version	Tracking Number	Issue
Any	1714	<p><b>IPv6 capsule support</b></p> <p>Trigence AE supports the standard RFC 1884 format where IPv4 Addresses are embedded within IPv6 Addresses.</p>
Any	2071	<p><b>X applications fail intermittently in a capsule</b></p> <p>You may experience some problems starting X applications in a capsule. Depending on the value of your DISPLAY environment variable, you may receive a message similar to the following when you start your X application:</p> <pre># export DISPLAY=10.0.101.41:0.0 # ./trictrl run ffminCapsule /usr/local/firefox/firefox Xlib: connection to "10.0.101.41:0.0" refused by server Xlib: No protocol specified (firefox-bin:3324): Gtk-WARNING **: cannot open display: # export DISPLAY=localhost:10.0 # ./trictrl run ffminCapsule /usr/local/firefox/firefox X11 connection rejected because of wrong authentication. X11 connection rejected because of wrong authentication. The application 'firefox-bin' lost its connection to the display localhost:10.0;most likely the X server was shut down or you killed/destroyed the application.</pre> <p>Workaround: The .Xauthority file that is in the capsule is preventing you from successfully running your X application. Delete the .Xauthority file that is in the capsule. This file may require deletion every time the capsule is undocked (with write) and moved to another Controller Platform.</p>

Version	Tracking Number	Issue																					
Any	2538	<p><b>Capsules do not support the execution of network and hardware services</b></p> <p>Network and hardware services should not be started and stopped inside a capsule as these services are managed by the server on which the capsule resides. Starting or stopping these services from inside a capsule may disrupt the normal execution of these services on the server.</p> <p>Workaround: Do not start, stop, alter or upgrade the services below from inside a capsule. This may inadvertently cause them to start during capsule initialization. These scripts are in <b>/etc/rc.d/init.d</b> for Red Hat , <b>/etc/init.d</b> for SUSE and <b>/etc/init.d</b> for Solaris.</p> <p>Do not select the services below from the Capsule Creator:</p> <table> <tbody> <tr><td>saslauthd</td><td>squid</td><td>rhnscd</td></tr> <tr><td>iptables</td><td>apmd</td><td>local</td></tr> <tr><td>isdn</td><td>ypbind</td><td>kudzu</td></tr> <tr><td>network</td><td>autofs</td><td>pcmcia</td></tr> <tr><td>keytable</td><td>nsqd lpd</td><td>netfs</td></tr> <tr><td>irda</td><td>gpm</td><td>xfs</td></tr> <tr><td>anacron</td><td>atd</td><td>boot</td></tr> </tbody> </table>	saslauthd	squid	rhnscd	iptables	apmd	local	isdn	ypbind	kudzu	network	autofs	pcmcia	keytable	nsqd lpd	netfs	irda	gpm	xfs	anacron	atd	boot
saslauthd	squid	rhnscd																					
iptables	apmd	local																					
isdn	ypbind	kudzu																					
network	autofs	pcmcia																					
keytable	nsqd lpd	netfs																					
irda	gpm	xfs																					
anacron	atd	boot																					

## Common issues and their resolutions

Version	Tracking Number	Issue
Any	2613	<p><b>Solaris 10 /etc/dumpadm.conf must be removed from capsule</b></p> <p>When you try to start a new Solaris10 capsule, you get the following message:</p> <pre>savecore: open("/dev/dsk/c0t2d0s3"): No such file or directory</pre> <p>You must delete the <b>/etc/dumpadm.conf</b> file from within the capsule as follows:</p> <ol style="list-style-type: none"> <li>1. Log into the Capsule Controller where the capsule exists.</li> <li>2. Change the “Create in Namespace” capsule property (cr) to the capsule GUID.</li> </ol> <pre># ./trictrl edit cr=&lt;capsuleGUID&gt;</pre> <p>For example:</p> <pre># ./trictrl edit cr=591C314726581F20</pre> <ol style="list-style-type: none"> <li>3. Dock the capsule (or undock while saving the changes and re-dock if it was already docked).</li> <li>4. Ensure that the file that you would like to delete exist in the capsule:</li> </ol> <pre># ./trictrl dir capsulename -l   grep /etc/dumpadm.conf</pre> <ol style="list-style-type: none"> <li>5. Run <b>/bin/bash</b> in the capsule. For example:</li> </ol> <pre># ./trictrl run capsulename /bin/bash</pre> <ol style="list-style-type: none"> <li>6. Delete the required files from the capsule. For example:</li> </ol> <pre># rm -rf /etc/dumpadm.conf</pre> <ol style="list-style-type: none"> <li>7. Exit <b>/bin/bash</b>.</li> <li>8. Change the “Create in Namespace” capsule property (cr) back to the original GUID as required.</li> <li>9. Undock the capsule with the -w option (to save the change).</li> </ol> <p>Ensure that you exclude the <b>/etc/dumpadm.conf</b> file from the Capsule Creator in the files selection step every time you create a Solaris 10 capsule.</p>

Version	Tracking Number	Issue
Any	2004	<p><b>Services added to a virtualized capsule will not start</b></p> <p>Workaround: These services may not start because files required by this service are not added to the capsule by default. Run learn mode on the service on the Source Platform to identify the required files and copy these files into the capsule using the scp command. See tracking number 2536 for an example of how to copy files into the capsule.</p>
Any	2051	<p><b>chroot command does not work inside a capsule</b></p> <p>Running the chroot command inside a capsule does not change the file systems root directory.</p> <p>Workaround: Do not use the chroot command inside a capsule. This will be fixed in a future release of the product.</p>
Any	2263	<p><b>Absolute path limitations</b></p> <p>Absolute paths that are greater than 4096 bytes are not supported from within a capsule. As well, a relative path reference to an absolute path that is greater than 4096 is also not supported.</p>

## Common issues and their resolutions

Version	Tracking Number	Issue
Any	2537	<p><b>Cannot ssh into a Solaris 8 virtualized capsule on a Solaris 9 and 10 Capsule Controller</b></p> <p>When you create a virtualized Solaris 8 capsule, the secure shell service (ssh) is default enabled. To ssh into a Solaris 8 capsule when it is docked and started on a Solaris 9 or 10 Capsule Controller, you must also enable the name service cache daemon (nscd). The nscd daemon can be enabled during and after capsule creation. The easiest way to enable the nscd daemon is using the Capsule Creator.</p> <p>Choose one of the three Workarounds:</p> <p>A. Enable the nscd daemon in the Capsule Creator (before capsule is built):</p> <p>Complete the instructions in “Appendix B: Remote Capsule Creation” in the Trigence AE User Guide. Ensure that you enable the nscd daemon from the Capsule Services Window.</p> <p>B. Enable the nscd daemon if your capsule is in template state:</p> <ol style="list-style-type: none"> <li>1. Log into the Solaris 8 Source Platform.</li> <li>2. Determine the start number for the nscd daemon:</li> </ol> <pre># ls /etc/rc2.d/*nscd</pre> <p>The output will reveal the start number. For example, if the output is <b>S76nscd</b> then the start number is 76.</p> <ol style="list-style-type: none"> <li>3. Determine the kill number for the nscd daemon:</li> </ol> <pre># ls /etc/rc0.d/*nscd</pre> <p>The output will reveal the kill number. For example, if the output is K40nscd then the kill number is 40.</p> <ol style="list-style-type: none"> <li>4. Log into the Capsule Controller Platform where the capsule exists.</li> <li>5. Navigate to the capsule directory. The TRIGENCE_HOME directory is the location where you installed the Trigence Capsule Controller. The default TRIGENCE_HOME directory is /usr/local/trigence.</li> </ol> <pre># cd TRIGENCE_HOME/capsules</pre> <ol style="list-style-type: none"> <li>6. Edit the Trigence services file. Note: the file may also exist as <b>trigence.enabled.services.bak</b>:</li> </ol> <pre># vi TRIGENCE_HOME/capsules/capsulename \ /cstore/etc/init.d/trigence.enabled.services</pre> <ol style="list-style-type: none"> <li>7. Add the following line to the Trigence services file. The line includes the nscd services path, the start and the kill numbers:</li> </ol> <pre>/etc/init.d/nscd 76 40</pre> <ol style="list-style-type: none"> <li>8. Start the capsule:</li> </ol>

Version	Tracking Number	Issue
Any	2529	<p><b>Error running learn mode as a non-root user</b></p> <p>For applications that you are running learn mode on, you must have read permissions set.</p> <pre># chmod a+r application</pre>
Any	2942	<p><b>Federated naming service not supported</b></p> <p>When creating a capsule, DO NOT select <b>Include All</b> for the <b>/xfn</b> folder (federated naming service folder). If you do, you may receive a message similar to the following when the Creator is building the capsule:</p> <p>Copy directory: /xfn/_x500/ -I/O error occurred copying the directory or its contents.</p> <p>Workaround: If you are still in the Capsule Creator, click <b>Previous</b> and exclude this folder from the File Selection Window. If you ignored these messages and have already created the capsule, delete the contents of the <b>/xfn</b> directory from the capsule after you have docked it.</p>

## 6.4. Capsule Controller Interface Commands (trictrl)

Version	Tracking Number	Issue
Any	2683	<p><b>Only change capsule IP address from Capsule Controller interface</b></p> <p>The capsule IP address should never be changed from within the capsule because it will also change the IP address of the underlying operating system. Always change the capsule IP address from the Capsule Controller interface (trictrl). For example:</p> <pre># ./trictrl edit capsulename dh=STATIC ip="10.0.101.98"</pre>
Any	2737	<p><b>Do not change UoS subnet from within Capsule</b></p> <p>The subnet configuration of UoS interfaces should never be changed from within the capsule because it will change the UoS subnet of the underlying operating system.</p> <p>Workaround: Revert the change from the underlying operating system.</p>

## Common issues and their resolutions

Version	Tracking Number	Issue
Any	2824	<p><b>Do not change UoS NIC from within Capsule</b></p> <p>The UoS NIC configuration should never be changed from within the capsule because it will change the UoS NIC of the underlying operating system.</p> <p>Workaround: Revert the change from the underlying operating system.</p>
Any	2826	<p><b>Do not change UoS routing from within Capsule</b></p> <p>The UoS routing configuration should never be changed from within the capsule because it will change the UoS routing of the underlying operating system.</p> <p>Workaround: Revert the change from the underlying operating system.</p>
Any	2777	<p><b>Virtualized Capsule fails when virtual memory limit is set too small</b></p> <p>If the user enters a value less than the minimum required to start a capsule, then the capsule start routine will fail. If the value is very low (e.g. 524288 bytes), a segmentation fault occurs.</p> <p>Workaround: Change the virtual memory property for the capsule to &gt; 256 MB memory limit.</p>

Version	Tracking Number	Issue						
Any	2890	<p><b>“Needs Manual Upgrade” state is displayed during capsule copy</b></p> <p>If you are copying a capsule to the capsule default directory, and you execute the list command, the state of the capsule will be displayed as “Needs Manual Upgrade”. For example:</p> <pre># ./trictrl list</pre> <table><thead><tr><th>Name</th><th>Type</th><th>Activated State</th></tr></thead><tbody><tr><td>oracle9i_Solaris9</td><td>Unknown</td><td>*     Needs Manual Upgrade</td></tr></tbody></table> <p>Disregard this state as it is not correct. When the copy is complete, the correct state will display.</p>	Name	Type	Activated State	oracle9i_Solaris9	Unknown	*     Needs Manual Upgrade
Name	Type	Activated State						
oracle9i_Solaris9	Unknown	*     Needs Manual Upgrade						

## 7. Open issues and their resolutions

This section describes issues that remain open at the moment of the publication of this note. The table lists the tracking number if one has been assigned to the issue.

### 7.1. Capsule Creator

Version	Tracking Number	Issue
3.0.2	2372	<p><b>Previous capsule folder is preserved (not removed)</b></p> <p>If you are on steps 2 or 3 (Services and Files Selection window) in the Capsule Creator and you click the <b>Previous</b> button back to the Identify Window (step 1) and change the capsule location, the previous capsule folder will be preserved.</p> <p>Workaround: Delete the previous capsule folder location.</p>
3.0.2	2691	<p><b>Services do not start in a remotely encapsulated SUSE Linux Enterprise Server 9.0 capsule</b></p> <p>For SUSE Linux Enterprise Server 9.0 capsules that are built using the remote creator procedure and the <code>minimumIncludedFiles.txt</code>, you must include all the <code>/usr/lib/lsb/*</code> in the file selection Capsule Creator window. If you do not, then services may not start in the capsule (services are not displayed when you run <code>./trictrl start capsule</code>), and you will have to manually add these files to the capsule.</p> <p>Workaround: These files must be copied into the capsule from the Source Platform. Complete the following procedure to do so:</p> <ol style="list-style-type: none"><li>2. Log into the Capsule Controller where the capsule exists.</li><li>5. Change the “Create in Namespace” capsule property (cr) to the capsule GUID. For example: <code># ./trictrl edit cr=&lt;capsuleGUID&gt;</code></li><li>6. Dock the capsule (or undock while saving the changes and re-dock if it was already docked).</li><li>7. Run <code>/bin/bash</code> in the capsule. For example: <code># ./trictrl run capsulename /bin/bash</code></li></ol>

Version	Tracking Number	Issue
		<p>8. Copy the required files from the Source Platform into the capsule:  <code># scp &lt;sourcehost&gt;:/usr/lib/lsb/* /usr/lib/lsb/*</code></p> <p>9. Exit <code>/bin/bash</code>.</p> <p>10. Change the “Create in Namespace” capsule property (cr) back to the original GUID.</p> <p>11. Undock the capsule with the -w option (to save the change).</p>

## 7.2. Capsules

Version	Tracking Number	Issue
3.0.7	2553	<p><b>sigrelse01</b></p> <p>Sigrelse01 fails inside Solaris 8 capsule running on 32 or 64-bit Solaris 9. This is a known issue. Sigrelse is not spoofed and does not behave properly in certain exceptional cases. Please contact Trigence Customer support if this issue affects any of your applications.</p>
3.0.7	3080	<p><b>Changing CPU binding from a single CPU to a set will fail on Solaris</b></p> <p>Changing from a single CPU binding (i.e. [0]) to a set (i.e. [0,1]) after a capsule is docked will not bind to the set as expected.</p> <p>Workaround: Edit the CPU binding string of the capsule, undock it, and save the new capsule. Dock the capsule and then you will be able to start new processes within the capsule, where the processes will now bind to the processor set as expected.</p>

Open issues and their resolutions

Version	Tracking Number	Issue
3.0.7	3087	<p><b>The who -r and fuser commands do not work inside a capsule</b></p> <p>Due to the potential incompatibility of the data structure used to store data concerning users logged into the system, the <code>/var/adm/utmpx</code> file should be left empty when the capsule source server OS is different from the underlying OS (UOS). Example of commands affected by this are: last, login, who, fuser and write.</p> <p>Workaround: There are two potential workarounds to address this problem.</p> <ol style="list-style-type: none"> <li>1. Exclude the above files from the capsule during creation time. As long as the UOS directories where these programs are located are visible to the capsule, then the commands will work using the UOS commands which will speak to the UOS <code>/var/adm/utmpx</code> file and display the same results as though you were issuing the commands from the UOS.  If a command is not visible to the capsule then it will be unavailable for use. This will result in no output if the capsule is being run from within a Solaris zone.</li> <li>3. Touch the file <code>/var/adm/utmpx</code> within the capsule context, and the default install command would be: <code>touch /var/adm/utmpx</code> from inside the capsule context.  This allows the commands to be called but no output will be displayed. This also removes the issue of whether the commands are visible or not from the UOS as long as they are included during the creation of the capsule.</li> </ol>

Version	Tracking Number	Issue
3.0.7	3088	<p><b>The cp command fails on ZFS or NFSv4 file systems with "failed to get acl entries"</b></p> <p>Inside a basic capsule within a Solaris 10 zone, trying to copy a file results in the error, "failed to get acl entries" and the loss of the ACL information for the file.</p> <p>This problem can occur when running a Trigence capsule that was captured from a pre-Solaris 10 system on Solaris 10.</p> <p>Workaround: If the application being captured makes use of ACLs then use workaround 2; otherwise, use workaround 1.</p> <ol style="list-style-type: none"> <li>1. Remove the commands that use ACLs from within the capsule context. Copying files will then use the cp command from the underlying OS which works correctly.</li> <li>2. In order for the original commands to behave properly, do not place this capsule on either a ZFS or an NFSv4 file system. Also, do not allow interaction between the capsule and files that are stored on either a ZFS or an NFSv4 file system.</li> </ol> <p>When a pre-Solaris 10 capsule is docked and attempts to interact with a ZFS/NFSv4 file system the resulting files will lose any pre-existing Group and/or World write permissions.</p>
3.0.7	3113	<p><b>Cannot rename a directory located in UOS from inside a virtual capsule</b></p> <p>A directory created on the host operating system cannot be renamed from inside a virtual capsule.</p> <p>Workaround: Rename the file from the underlying operating system.</p>
3.0.7	3119	<p><b>Using scp to copy a file into a virtual capsule returns “scp: &lt;filename&gt;: truncate: Invalid argument” even though copy succeeds</b></p> <p>Using scp to copy a file into a capsule succeeds but an error message is returned.</p> <p>Workaround: No action required. This message can be safely ignored.</p>

Open issues and their resolutions

Version	Tracking Number	Issue
3.0.2		<p><b>NIS configuration problem for some capsule applications</b></p> <p>Certain applications may reference the original Source Platform's domain name within their configuration files. The Source Platform's domain name is not automatically inherited by a capsule.</p> <p>Workaround: This may cause certain <i>hostame.domainname</i> address lookups to fail, as the name tuple with the particular domain name might not exist. Enforce the following to avoid this domain name problem:</p> <ul style="list-style-type: none"> <li>• Maintain a common domain name for both the Source and Controller Platform servers.</li> <li>• Ensure that the Controller Platform has a domain name.</li> <li>• Manually add the <i>hostame.domainname</i> tuple to the <b>/etc/hosts</b> file on each Controller Platform.</li> </ul>
3.0.7	969	<p><b>Capsule Controller Platform inherits capsule date and time changes</b></p> <p>When you change the date or time within a capsule, the date or time on the underlying operating system will also be changed.</p> <p>Changes that take place within a capsule should not affect the underlying operating system. Applications installed natively on the server may be affected by the date or time change.</p> <p>Workaround: Ensure that when you make date and time changes within the capsule, it will not adversely affect native applications running on the server. If it does, revert to the original date and time on the server.</p>
3.0.2	2634	<p><b>Digital Rights Management (de) capsule property is not supported in this release</b></p> <p>This release does not support Digital Rights Management (de) capsule property.</p>

Version	Tracking Number	Issue
3.0.2	1994	<p><b>Cannot connect to port 7002 error for encapsulated BEA</b></p> <p>When you dock and start a virtualized BEA capsule, you may receive the following message:</p> <pre>Cannot connect to port 7002</pre> <p>Workaround: Configure BEA with the new IP address. Refer to the BEA documentation for network configuration details.</p>
3.0.2	1827	<p><b>Encapsulated Red Hat 2.4 gnome applications on Linux 2.6 systems</b></p> <p>If you run an encapsulated gnome application that is a different operating system version as the Capsule Controller, you may receive a message similar to the following:</p> <pre># ./trictrl run gedit_RHES3_SMPCapsule /usr/bin/gedit  (gedit:13898): Bonobo-WARNING **: Failed to get '/desktop/gnome/interface/menubar_detachable': 'Failed to contact configuration server; some possible causes are that you need to enable TCP/IP networking for ORBit, or you have stale NFS locks due to a system crash. See http://www.gnome.org/projects/gconf/ for information. (Details - 1: IOR file '/root/.gconfd/lock/ior' not opened successfully, no gconfd located: No such file or directory 2: IOR file '/root/.gconfd/lock/ior' not opened successfully, no gconfd located: No such file or directory)'</pre> <p>Workaround: To run an encapsulated Red Hat Enterprise Linux 3.0 gnome application on a Red Hat Enterprise 4.0 Controller Platform, set the environment variable inside the capsule:</p> <pre># export GCONF_LOCAL_LOCKS=1</pre> <p>To run an encapsulated Red Hat Enterprise Linux 3.0 gnome application on a SUSE Linux Enterprise Server 9.0 system, create the symbolic link inside the capsule:</p> <pre># ln -s /opt/gnome/lib/GConf/2/gconfd-2 /usr/libexec/gconfd-2</pre>

Open issues and their resolutions

Version	Tracking Number	Issue
3.0.2	2042	<p><b>tclonefs application fails on root_squash NFS directory</b></p> <p>The tclonefs application may not function correctly on a root_squash NFS directory.</p> <p>Workaround: Do not use the NFS root_squash export permission when exporting file systems from inside a capsule.</p>
3.0.2	1888	<p><b>mount and df commands display incorrect information from inside a capsule</b></p> <p>The mount and df commands may display incorrect information from inside a capsule.</p> <p>Workaround: Use the following command to display information about the current mounted file systems:</p> <p>On Linux: # cat /proc/mounts</p> <p>On Solaris: # cat /etc/mnttab</p>
3.0.2	2252	<p><b>Directory permission requirements differ on Solaris vs. encapsulated Solaris</b></p> <p>In a Solaris environment, a parent directory only requires executable permissions to access a file in a child directory. In the following example path, to reference <code>c_file</code>, <code>a_dir</code> only requires executable permissions.</p> <p>Example Path: <code>/a_dir/b_dir/c_file</code></p> <p>In a Solaris capsule, a parent directory requires read and executable permissions to access a file in a child directory. In the above example path, to reference <code>c_file</code>, <code>a_dir</code> requires both executable and read permissions.</p> <p>Workaround: Access to files in child directories may be denied due to insufficient permissions on parent directories. Use the chmod command to enable read permissions on the encapsulated directories where required.</p>
3.0.2	2304	<p><b>read and pread system calls differ on Unix vs. encapsulated Unix</b></p> <p>A read or pread system call on a directory that will normally fail on Linux and Solaris will work in an encapsulated environment.</p>

Version	Tracking Number	Issue
3.0.2	2536	<p><b>User and group forced excluded files may be required for some ‘basic’ encapsulated applications</b></p> <p>The Capsule Creator will force exclude the <code>/etc/passwd</code>, <code>/etc/shadow</code> and <code>/etc/group</code> files when creating a basic capsule. Unfortunately, some applications rely on these files for certain operations. For example, Oracle requires these files to run as oracle:dba.</p> <p>Workaround: These files must be copied into the capsule from the Source Platform. Complete the following procedure to do so:</p> <ol style="list-style-type: none"> <li>1. Log into the Capsule Controller where the capsule exists.</li> <li>2. Change the “Create in Namespace” capsule property (cr) to the capsule GUID. (The default is the hostfs GUID.) For example:  <code># ./trictrl edit cr=&lt;capsuleGUID&gt;</code></li> <li>3. Dock the capsule (or undock while saving the changes and re-dock if it was already docked).</li> <li>4. Run <code>/bin/bash</code> in the capsule. For example:  <code># ./trictrl run capsulename /bin/bash</code></li> <li>5. Copy the required files from the Source Platform into the capsule:  <code># scp &lt;sourcehost&gt;:/etc/passwd /etc/passwd  # scp &lt;sourcehost&gt;:/etc/shadow /etc/shadow  # scp &lt;sourcehost&gt;:/etc/group /etc/group</code></li> <li>6. Exit <code>/bin/bash</code>.</li> <li>7. Change the “Create in Namespace” capsule property (cr) back to the hostfs GUID. For example:  <code># ./trictrl edit cr=00000000000000000001</code></li> <li>8. Undock the capsule with the -w option (to save the change).</li> </ol>
3.0.2	2245	<p><b>Maximum number of file handles is reduced</b></p> <p>Because of the nature of our Capsule File Mapping, we use a number of file handles; therefore, the maximum number of file handles for processes will be reduced. This may affect your capsule application if requires the maximum number of files handles for it to operate.</p>

Open issues and their resolutions

Version	Tracking Number	Issue
3.0.2	2941	<p><b>Using telnetd and ftpd from within a capsule</b></p> <p>To use telnetd and ftpd from within a capsule, complete the following:</p> <p>For Solaris:</p> <ul style="list-style-type: none"> <li>• Ensure that telnetd, ftpd and all dependencies are in the capsule</li> <li>• Do NOT include inetd as a service from the service selection window in the Capsule Creator</li> <li>• Either manually start inetd:           <pre># ./trictrl run capsule /usr/sbin/inetd -s" or enable "/usr/sbin/inetd -s" as your startup script</pre> </li> </ul> <p>For Linux:</p> <ul style="list-style-type: none"> <li>• Select xinetd from the services selection screen in the Capsule Creator</li> </ul>

### 7.3. Capsule Controller Interface Commands (trictrl)

Version	Tracking Number	Issue
3.0.2	2241	<p><b>Capsule starts with “insserv: can not symlink” messages</b></p> <p>When starting a capsule you may receive messages similar to the following when you start your capsule:</p> <pre>insserv: can not symlink(../boot.localfs, boot.d/S07boot.localfs): File exists</pre> <p>Disregard these messages. The capsule will start and function normally.</p>

## 8. Product Documents

The following documents support the product:

- *Trigence AE Installation Guide*
- *Trigence AE User Guide*

To view the latest Trigence AE documentation and release notes, visit the Customer Support Web page at <http://www.trigence.com/support>.

## 9. Customer Support

If you have problems with or questions about Trigence AE, go to the Trigence Customer Support page at <http://www.trigence.com/support>. You can view and download product documents, release notes, frequently asked questions, and related information from the Customer Support Web site. If you do not have access to the Web and you are in the USA or Canada, contact Trigence Software Customer Support at 1-866-444-6670, option 3. Outside the USA or Canada, contact your local Trigence Corporation office or agent.